Energy and Sustainability Statement Emmaus Bristol Roof Top Community

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1.1. Energy

All proposed homes have taken account of impending changes to Part L of the Building Regulations and the Future Homes Standard 2025. Each home can already achieve exceptional air tightness and energy efficiency, using our pre-fabricated straw panel (PFSP) building system and MVHR, but this will need to be supplemented with solar PV.

The proposed homes will perform above the required standards for CO2 emissions, not least because their of excellent heat retention qualities. This is based on a carefully considered approach to producing an efficient, low impact 'fabric first' design supplemented by the latest renewable technologies available.



1.2 Energy breakdown and implementation



We have sought to comply with the Council's policies on climate change and sustainability, which requires a 20% reduction in CO2 emissions using renewable technologies. As such we have add 2kw solar PV on seven of the homes, producing a total capacity of 14kw.

This a provided **27%** reduction in residual carbon emissions as demonstrated in the table below

Dwelling	PV Kwp	
DW01	2	
DW02	2	1
DW03	0	1
DW04	0	
DW05	2	1
DW06	2	All PV mounted
DW07	0	horizontal (less than
DW08	0	15%) connected directly
DW09	0	to the flat via individual
DW10	0	inverters
DW11	0	-
DW12	2	1
DW13	2	1
DW14	0	1
DW15	2	

	Energy demand (kWh pa)	Energy saving achieved (%)	Regulated CO2 emissions (kg pa)	Saving achieved on residual CO2 emissions (%)
Building Regulations Part L compliance ("Baseline")	42,311.95		25,749,54	
Proposed scheme after energy efficiency measures and CHP ("Residual")	42,311.95	0	24,316.95	
Proposed scheme after on- site renewables	31,665.02	25.16	18,792.14	22.72
Total savings on residual emissions				27.02

roof plan with PV locations

1.3 Energy breakdown and implementation

U-values and airtightness performance comparison

Element or System	Part L Values (2013 - or most current)						
	Dwellings Lower	Dwellings Notional	Non Dwellings Lower	Non Dwellings Notional	Proposed		
Wall	0.30	0.18	0.35	0.26	0.21		
Roof	0.20	0.13	0.25	0.18	0.18		
Floor	0.25	0.13	0.25	0.22	0.19		
Windows /Doors	2.00	1.4	2.2		1		
Permeability	10.00	5.00	10.00	5.00	2*		

* Actually on site permeability testing using PFSP has never exceeded 1.5

Performance of the proposed homes generally exceeds Part L values especially when looking at overall airtightness and thermal performance of fenestration, which is often overlooked. This shows that the proposed homes perform very well compared to other products available.

A rated EPC for units supplemented with PV 47% of units



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

Average across Scheme: 85+ B EPC average for All Units proposed

Note all Energy assessment data curtesy of Darren Evans Assessments SAP calculations on all 15 units as orientated on Proposed Plan layouts.

2. Sustainability Statement

Agile's homes are designed using low carbon principles, with low u-values, air tightness and low thermal bridging. This means that there will be low energy demand and low running costs.

Furthermore the acoustic quality of the building, coupled with high performance glazing, environmentally friendly paints and internal finishes, creates a healthy, safe and peaceful environment for any occupiers and low maintenance costs.

The main materials used in construction are wood and straw. These are natural, photosynthetic materials which have sequestered huge amounts of CO2 during their lifecycle. Carbon capturing materials such as this are the future of the construction industry. They demonstrate how we can reduce our greenhouse gas emissions and help combat the climate crisis. A one bedroom Tam typically captures or banks 27 tonnes of carbon.

Straw insulation has fantastic acoustic and moisture control properties:

- Protection from external sources of noise
- Comfortable humidity levels without damp
- Low levels of airborne chemicals such as VOC's (commonly emitted from synthetic insulation alternatives).



straw

Is there enough? UK farming produces 12 million tonnes of straw each year. 6 million tonnes is ploughed back into the soil. 3 million tonnes is used for animal bedding and 3 million tonnes of straw is buffered into barns. The global harvest of straw is 607 million tonnes.

photosynthesis

uses simple ingredients - sunlight, water and CO₂.

Through photosynthesis, plants absorb CO₂ from the atmosphere. They use the carbon to make cellulose and return the oxygen to atmosphere. Photosynthesis is bio-evolved, solar powered carbon capture.

By product - oxygen. These Eco Pods are built with carbon.

PFSP - Prefabricated Straw Panel system - Carbon Capture

The total amount of CO2 captured are banked within this home through the use of timber and straw equates to 27 tonnes of atmospheric CO2 is captured / banked within a one bedroom (37m2) Agile home, through the use of timber and straw.

The adjacent image has been modelled by Real World Visuals to give the physical perspective on this true volume. Each blue sphere is the accurate size of 1kg of CO2 relative to a person and the proposed building.

Waste collection

The development will include, at street level, new residential refuse stores in accordance with BCC refuse and recycling guidance for developers and occupiers. See further details in the Design & Access Statement.

Foul and Grey water

All foul and grey water will be disposed of via the mains sewer serving the existing building

SUDs

Existing drainage infiltration rates on the roof will be improved by the addition of lightweight Sedum roofs on 60% of the proposed roof areas. This should improve average water attenuation rates by up to 40% compared to the existing situation at Backfields House

Adaptability of buildings

The pre-fabricated modular building system is designed to be flexible and 'agile', to meet the changing needs of occupiers and the needs of the housing market. Homes can be used for a range of different tenures, by single people and by families. The buildings can be used for other purposes, such as workspace, Air B & B (for purpose) and meeting space.



